CLAIMS

What is claimed is:

1. A modified Θ-Al_2O_3-supported nickel reforming catalyst expressed by the following formula 1, which is used for producing synthesis gas mixture of carbon monoxide and hydrogen from natural gas,

$$M_1\text{-}\ M_2\text{-Ni/}\ M_3\text{-}\ M_4\text{-}ZrO_2/\Theta\text{-}Al_2O_3 \qquad (1)$$

wherein M_1 is an alkali metal; each of M_2 and M_3 is an alkaline earth metal; and M_4 is a IIIB element or a lanthanide.

2. A nickel reforming catalyst according to Claim 1, which is composed of 3-20 wt.% of: nickel (Ni) against Θ-Al_2O_3; 0-0.2 molar equivalent of M_1 and 0-4 molar equivalent of M_2 cocatalysts against nickel; 0-1.0 molar equivalent of M_3 and 0.01-1.0 molar equivalent of M_4 against zirconium; and 0.01-1.0 molar equivalent of ZrO_2 against Θ-Al_2O_3.

3. A nickel reforming catalyst according to Claim 1, wherein said Θ-Al_2O_3 support is modified with modified zirconia (M_3-M_4-ZrO_2) m1423) thrrecipitation or sol-gel method.

4. A nickel reforming catalyst according to Claim 1, wherein said nickel and cocatalyst (M_1-M_2-Ni) is supported on the modified support (M_3-M_4-ZrO_2/Θ-Al_2O_3) through molten-salt or impregnation.

5. A method for producing synthesis gas mixture of carbon monoxide and hydrogen from methane natural gas by steam reforming, oxygen reforming or steam-oxygen reforming, wherein a catalyst selected from Claims 1 to 4 is used; methane-to-steam molar ratio is 0-6; methane-to-oxygen molar ratio is 0-1; reaction temperature is 600-1000℃; reaction pressure is 0.5-20 atm; and space velocity is 1,000-1,000,000cc/hr·g-cat.

6. A producing method of synthesis gas from natural gas according to Claim 5, wherein: for steam reforming, methane-to-steam molar ratio is 1-6; for oxygen reforming, methane-to-oxygen molar ratio is 0.1-1; and for steam-oxygen reforming, methane-to-steam molar ratio is 1-5 and methane-to-oxygen molar ratio is 0.1-1.